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Study of *Cucumis melo momordica* Seed Oil

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CUCUMIS melo momordica known as "Phut" (Ripe) or "Kachari" (unripe) in Hindi belongs to the family *Cucurbitaceae*.[1,2] The seeds are cooling. The present work deals with the chemical investigation of the seed oil of phut which has not been reported so far. For proper and economic utilization of this oil information on general characteristics and fatty acid composition is of utmost importance. The main objective of the work was to correlate the fatty acid composition with its medicinal application.

Experimental

Authentic samples of the seeds used in the present investigation were collected from the district of Banda. 750 g dried seeds were broken by suitable methods and the shells were separated from the kernel. The kernels were powdered and moisture content was determined. The oil content was determined in a continuous soxhlet extractor using petroleum ether (60°–80°) as solvent. This was purified by filtering through animal charcoal and drying over anhydrous sodium sulphate. The characteristics of the oil were determined by conventional methods. The results are presented in Table 1. 100 g oil were mixed with excess of alcoholic KOH and boiled for 8 hr over a water bath. The alcohol was distilled off and the soap was dissolved in excess of water. The unsaponifiable matter separated by filtration. Then the soap solution was extracted with ether. This removed any remaining unsaponifiable matter. The soap solution was treated with dil. sulphuric acid and the mixture was heated for a few minutes. The liberated fatty acids were taken in a separating funnel after dissolving the fatty acids in ethyl ether. The ethereal solution of fatty acids was washed several times with water to free it from impurities. Ether was distilled off and a mixture of fatty acids obtained. The mixed fatty acids were separated into solid and liquid acids by Twitchell's lead salt method modified by Hilditch.[3,4]

The saponification and iodine values of the mixed fatty acids (solid and liquid) were determined separately and presented in a tabular form (Table 2).

Table 1—Characteristics of oil seeds and oil.

Moisture %	8·3
Oil %	35·6
Colour of Oil	Light yellow
Refractive index 30°	1·4600
Specific gravity 32°	0·9154
Acid value	9·4
Saponification value	211·3
Iodine value	80·4
Saponification equivalent	265·5
Consistency	Liquid
U.M.	0·62%

Table 2—Characteristics of solid and liquid fatty acids

	Solid fatty acids	Liquid fatty acids
%	23·3%	76·7%
Iodine value	26·3	96·1
Saponification value	235·0	208·0
Saponification equivalent	238·2	269·7

Table 3—Fractional distillation of solid fatty acid methyl esters

Total weight of esters = 14.7 g.

Fractions	Distillation temp. in °C	Weight of acids in gm.	S.V. of acids	S.E. of acids	I.V. of acids
1.	150–165	3·0	269·3	208·3	19·80
2.	165–180	2·8	216·4	259·2	20·95
3.	180–195	4·1	205·3	273·3	28·53
4.	195 & above	2·9	205·1	273·3	31·03

Pressure = 10 mm.

Table 4—Fractional distillation of liquid fatty acid methyl esters

Total weight of esters = 48.0 g.

Fractions	Distillation temp. in °C	Weight of acids in gm.	S.V. of acids	S.E. of acids	I.V. of acids
1.	150–160	3·1	197·2	284·4	67·6
2.	160–170	7·6	203·9	276·1	84·2
3.	170–180	18·2	199·1	281·7	121·1
4.	180 & above	10·8	194·9	282·7	119·2

Pressure = 10 mm.

The quantitative and qualitative composition of the component acids of the mixed fatty acids are determined by methyl ester distillation, urea adduct fractionation and paper chromatographic method.

TABLE 5—FATTY ACID COMPOSITION OF THE OIL

Species	10 : 0	12 : 0	14 : 0	16 : 0	16 : 1	18 : 0	18 : 1	18 : 2
Cucumis melo momordica.	1·2	3·26	0·74	13·24	0·45	7·90	47·77	25·44

Results and Discussion

Cucumis melo momordica (Phut) oil (35·6% on kernel) is light yellow in colour. The major fatty acid component of the oil are oleic acid (47·77%) and linoleic acid (25·4%). Palmitic and stearic acids are present to the extent of 13·24% and 7·9% respectively. The other acids present are lauric (3·26%), capric (1·20%) and myristic (0·74%). Hexadecenoic acid is present to the extent of 0·45%. Comparison of the fatty acid composition of this oil with others shows that high percentage of unsaturated fatty acids in the oil is responsible for the cooling effect of the seeds.

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Chemical Constituents of Stems of *Piper nigram* Linn

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THE fruits of *Piper nigrum* L. are well known[1] for their economic and medicinal importance. The present report which forms a part of our continuing study[2] of *Piper* species, deals with the chemical examination of the stems of *P. nigrum* L. as no report on chemical constituents of stems is available so far.

The petroleum ether extract of the air dried, coarsely powdered stems of *P. nigrum* (770g) deposited a greenish-yellow residue (A, 1·415 g), which on crystallisation from petroleum ether–ethyl acetate gave a yellowish crystalline compound (Pns-1, 0·810 g) m.p. 128°–29° identified as piperine. It formed a bromo-derivative, m.p. 115°–16° and a tetrhydro derivative (waxy) on hydrogenation over Pd/C (5%), identified by UV, IR and NMR spectral analysis. Alcoholic KOH hydrolysis of Pns-1 gave piperic acid and piperidine, identified by m.m.p. and Co-TLC with authentic samples of piperic acid and piperidine HCl, respectively. Further proof of the compound Pns-1 as piperine was established by TLC, m.m.p., UV, IR, NMR and Mass spectral analysis with an authentic sample of piperine.

The mother liquor after the removal of residue (A) on concentration and cooling deposited a whitish-yellow residue (B, 0·120 g) which on crystallisation from alcohol gave piperine (Pns-1, 60 mg), m.p. 128°–29° and a white recrystalline compound (Pns-2, 30 mg) m.p. 78°–80°, identified as hentriacontanone-16 by Co-TLC, mixed TLC, m.m.p. and IR analysis of an authentic sample of hentriacontanone-16.

The mother liquor after the removal of residue (B) on further concentration and cooling deposited a greenish-yellow residue (C, 300 mg) which on crystallisation from alcohol gave piperine and a yellow amorphous solid (Pns-3, 40 mg), m.p. 133°–35° which could not be identified. The residue (C) after the removal of Pns-1 and Pns-3 gave a white compound from acetone (Pns-4, 85 mg), m.p. 67°–69°, identified as hentriacontane by m.m.p., Co-TLC, IR and NMR spectral analysis of an authentic sample of hentriacontane.

The mother liquor after the removal of residue (C) was distilled in vacuo to give a dark green viscous liquid (D, 10·250 g) which was chromatographed over neutral alumina (150 g). Elution with petroleum ether–benzene (70 : 30) gave a white compound (Pns-5, 30 mg), m.p. 82°–84°, identified as hentriacontanol-16 by m.m.p., Co-TLC, mixed TLC, IR and acetate derivative of an authentic sample of hentriacontanol-16. Elution with benzene gave piperine (Pns-1) and elution with benzene–ethyl acetate (90 : 10) gave a white solid (Pns-6, 120 mg), identified as β-sitosterol by m.m.p., Co-TLC, IR, NMR and Mass spectral analysis and acetate derivative of an authentic sample of β-sitosterol.

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